INFORMATION SHEET 4: Definition of terms

Yes, the study of, and the working with electronics requires some mathematics. With some practice most of us can handle that pretty well.

| TERMS	MEASUREMENT UNITS	NAMED IN HONOR OF
I = Electron current	A = Amperes	"Andre-Marie Ampere"
E= Electromotive Force	V = Volts	"Alessandro Volta"
R = Resistance	Ω = Ohms	"Georg Simon Ohm"
P = Power	W = Watts	"James Watt"

DEFINITIIONS

Resistance	The opposition to current flow
Electromotive Force	An electric potential of intensity or pressure
Power	The rate of doing work
Electron current	Flow of an electric charge
Ampere	One coulomb per second past a given point (6.24 Quintillion negative charges)
Voltage	Difference in potential between two points
Ohm	The value of resistance that allows 1 Ampere to flow with 1 Volt applied
Watt	One Joule per second. Equivalent to 1/746 horsepower.

Ohm's Law says that the voltage across a circuit divided by the current through that circuit equals the resistance of that circuit. $E/I = R$.
A second formula tells us we can find the power dissipated by $IE = P$.
The other formulae in the "Ohm's Law" wheel are derived from these two. If you know any two values of I, E, R or P, you can find the others.

(a)
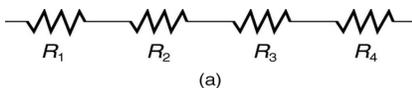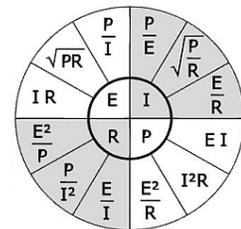
(a) Current is the same through each resistor in a series circuit. The voltage across each resistor is proportional to the resistance. The total resistance of a series circuit is the simple addition of each resistor $R_1+R_2+R_3+R_4. = R_{total} = 10+20+30+40 = 100$

(b)
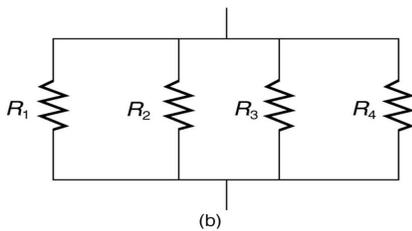
(b)Voltage is the same across each resistor in a parallel circuit. The current through each resistor is inversely proportional to the value of the resistance. The total resistance of a parallel circuit is always less than the value of the smallest resistor. Calculation of two resistors is easy. $R_1 \times R_2 / R_1+R_2=R_{total}$

Example: 10 ohms and 20 ohms in parallel.
$10 \times 20 / 10+20 = 200 / 30 = 6.667$ Ohms

R1 = 10 Ohms
R2 = 20 Ohms
R3 = 30 Ohms
R4 + 40 Ohms

For more than two resistors the formula is:
$1/R_1 + 1/R_2 + 1/R_3 + 1/R_4 . . .= 1/R_{total}$

Example: $1/10 + 1/20 + 1/30 + 1/40 = 1/Rtotal$

$.1 + .05 + .0333 + .025 = 1/.2083$

$1/.2083 = 4.8$ Ohms

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